

1. A print carriage and ink supply system for a printer, comprising:
a print carriage adapted for lateral reciprocation along a print medium within a printer, the print carriage including at least one print head;
an ink pump including an ink inlet in fluid communication with an ink source, an ink outlet in fluid communication with the print head, and a pump actuator for at least initiating displacement of ink through the ink pump upon actuation; and
a pendulum pivotally coupled to the print carriage for pivotal movement with respect to the print carriage in reaction to acceleration of the print carriage laterally along the print medium, the pendulum being mechanically linked to the pump actuator;
whereby the pendulum actuates the pump at least upon certain accelerations of the print carriage laterally along the print medium.
2. The print carriage and ink supply system of claim 1, wherein the pendulum is pivotally coupled to the print carriage at a pivot point and includes an internal mass arm extending from the pivot point and an opposing actuator arm extending from the pivot point, the actuator arm being mechanically linked to the pump actuator.
3. The print carriage and ink supply system of claim 2, wherein the actuator arm is coupled to a piston carried on the ink pump, the piston having a reciprocation path, and the piston being in contact with the pump actuator along at least a portion of the piston's reciprocation path.
4. The print carriage and ink supply system of claim 3, wherein the pump is a displacement type pump.
5. The print carriage and ink supply system of claim 4, wherein the pump is a diaphragm pump and the pump actuator includes a pump diaphragm enclosing at least a portion of a displacement volume of the diaphragm pump.
6. The print carriage and ink supply system of claim 5, wherein the diaphragm pump includes a pump housing containing the displacement volume, the pump diaphragm,

the pump inlet in fluid communication with the displacement volume, and the pump outlet in fluid communication with the displacement volume.

7. The print carriage and ink supply system of claim 6, wherein the pump housing is coupled to the print carriage, the pump housing contains the piston, and the pendulum is pivotally coupled to the pump housing.

8. The print carriage and ink supply system of claim 6, wherein the pump housing contains a first check valve in fluid communication with the valve inlet and a second check valve in fluid communication with the valve outlet.

9. The print carriage and ink supply system of claim 8, wherein the first and second check valves comprise reed valves.

10. The print carriage and ink supply system of claim 2, wherein the inertial mass arm of the pendulum is substantially longer and heavier than the actuator arm of the pendulum.

11. The print carriage and ink supply system of claim 10, wherein the inertial mass arm has a mass of approximately 2 grams to approximately 200 grams.

12. The print carriage and ink supply system of claim 10, wherein the ratio of pivot distance of travel between the inertial mass arm and the actuator arm is between approximately 0.5 and approximately 10 to one.

13. The print carriage and ink supply system of claim 12, wherein the inertial mass arm has a mass of approximately 2 grams to approximately 200 grams.

14. The print carriage and ink supply system of claim 13, wherein the actuator arm is coupled to a piston carried on the ink pump, the piston having a reciprocation path,

and the piston being in contact with the pump actuator along at least a portion of the piston's reciprocation path.

15. The print carriage and ink supply system of claim 4, wherein the pump is a diaphragm pump, the pump actuator includes a pump diaphragm enclosing at least a portion of a displacement volume of the diaphragm pump, and the displacement volume of the pump is approximately 0.002 cm^3 to approximately 1 cm^3 .

16. The print carriage and ink supply system of claim 1, wherein the pendulum is coupled to a reciprocating body carried on the ink pump, the reciprocating body having a reciprocation path, and the reciprocating body being in contact with the pump actuator along at least a portion of the piston's reciprocation path.

17. The print carriage and ink supply system of claim 1, wherein the pendulum is pivotally coupled to the print carriage at a pivot point and includes an internal mass arm extending from the pivot point, the inertial mass arm being mechanically linked to the pump actuator.

18. The print carriage and ink supply system of claim 17, wherein the inertial mass arm is coupled to a piston carried on the ink pump, the piston having a reciprocation path, and the piston being in contact with the pump actuator along at least a portion of the piston's reciprocation path.

19. A print carriage and ink supply system for a printer, comprising:
a print carriage adapted for lateral reciprocation along a print medium within a printer, the print carriage including at least one print head;
an ink pump including an ink inlet in fluid communication with an ink source, an ink outlet in fluid communication with the print head, and a pump actuator for at least initiating displacement of ink through the ink pump upon actuation; and

an inertial mass coupled to the print carriage for reciprocating movement with respect to the print carriage in opposing reaction to acceleration of the print carriage laterally along the print medium;

the inertial mass being indirectly linked to the pump actuator by a mechanical linkage;

whereby the combination of the inertial mass and mechanical linkage actuates the pump at least upon certain accelerations of the print carriage laterally along the print medium.

20. The print carriage and ink supply system of claim 19, wherein the inertial mass is provided on a first arm of a pendulum pivotally coupled to the print carriage, and the pendulum is a component of the mechanical linkage.

21. The print carriage and ink supply system of claim 20, wherein the mechanical linkage includes a piston pivotally coupled to an opposing arm of the pendulum, the piston is mounted for reciprocation along a piston path on the print carriage, and the piston path includes the pump actuator.

22. The print carriage and ink supply system of claim 21, wherein the pump is a displacement type pump.

23. The print carriage and ink supply system of claim 22, wherein the pump is a diaphragm pump and the pump actuator includes a pump diaphragm enclosing at least a portion of a displacement volume of the diaphragm pump.

24. The print carriage and ink supply system of claim 23, wherein the diaphragm pump includes a pump housing containing the displacement volume, the pump diaphragm, the pump inlet in fluid communication with the displacement volume, and the pump outlet in fluid communication with the displacement volume.

25. The print carriage and ink supply system of claim 24, wherein the pump housing is coupled to the print carriage, the pump housing contains the piston, and the pendulum is pivotally coupled to the pump housing.

26. The print carriage and ink supply system of claim 24, wherein the pump housing contains a first check valve in fluid communication with the valve inlet and a second check valve in fluid communication with the valve outlet.

27. The print carriage and ink supply system of claim 26, wherein the first and second check valves comprise reed valves.

28. The print carriage and ink supply system of claim 20, wherein the first arm of the pendulum is substantially longer and heavier than the opposing arm of the pendulum.

29. The print carriage and ink supply system of claim 28, wherein the first arm has a mass of approximately 2 grams to approximately 200 grams.

30. The print carriage and ink supply system of claim 28, wherein the ratio of pivot distance of travel between the first arm and the opposing arm is between approximately 0.5 and approximately 10 to one.

31. The print carriage and ink supply system of claim 30, wherein the first arm has a mass of approximately 2 grams to approximately 200 grams.

32. The print carriage and ink supply system of claim 31, wherein the opposing arm is coupled to a piston carried on the ink pump, the piston having a reciprocation path, and the pump actuator being positioned along at least a portion of the piston's reciprocation path.

33. The print carriage and ink supply system of claim 19, wherein the inertial mass extends outwardly with respect to the print carriage and reciprocates a swinging motion.

34. The print carriage and ink supply system of claim 33, wherein the inertial mass extends below the print carriage.

35. The print carriage and ink supply system of claim 19, further comprising a plurality of the ink pumps for a corresponding plurality of printer inks.

36. The print carriage and ink supply system of claim 35, further comprising a corresponding plurality of the inertial mass and mechanical linkage combinations for the respective plurality of the ink pumps.

37. The print carriage and ink supply system of claim 35, wherein:
the plurality of ink pumps each respectively include a pump actuator; and
the inertial mass is indirectly linked to each of the pump actuators by the mechanical linkage.

38. The print carriage and ink supply system of claim 19, wherein the mechanical linkage is a mechanical advantage linkage.

39. The print carriage and ink supply system of claim 38, wherein the mechanical advantage linkage includes a lever mechanism.

40. The print carriage and ink supply system of claim 38, wherein the mechanical advantage linkage includes at least one of:
a lever mechanism;
a gear mechanism; and
a cam mechanism.

41. The print carriage and ink supply system of claim 19, wherein the pump is a displacement type pump.

42. The print carriage and ink supply system of claim 41, wherein the displacement type pump is taken from a group consisting of:

- a diaphragm pump;
- a bellows pump; and
- a piston-type pump.

43. A printer comprising:

- a printer housing;
- a drive assembly provided in the printer housing for driving a print medium through the printer housing;
- a print carriage adapted for lateral reciprocation along a print medium carried by the drive assembly within the printer housing, the print carriage including at least one print head;
- a controller for coordinating the operations of the drive assembly and print carriage with respect to each other;
- an ink pump provided in the printer housing, including an ink inlet in fluid communication with an ink source, an ink outlet in fluid communication with the print head, and a pump actuator for at least initiating displacement of ink through the ink pump upon actuation;
- an inertial mass coupled to the print carriage for reciprocating movement with respect to the print carriage in opposing reaction to acceleration of the print carriage laterally along the print medium; and

a mechanical advantage linkage coupling the inertial mass to the pump actuator;

whereby the combination of the inertial mass and mechanical advantage linkage actuates the pump at least upon certain accelerations of the print carriage laterally along the print medium.

44. The printer of claim 43, wherein the inertial mass is provided on a first arm of a pendulum pivotally coupled to the print carriage, and the pendulum is a component of the mechanical advantage linkage.

45. The printer of claim 44, wherein the mechanical advantage linkage includes a piston pivotally coupled to an opposing arm of the pendulum, the piston is mounted for reciprocation along a piston path on the print carriage, and the piston path includes the pump actuator.

46. The printer of claim 45, wherein the pump is a diaphragm pump and the pump actuator includes a pump diaphragm enclosing at least a portion of a displacement volume of the diaphragm pump.

47. The printer of claim 45, wherein the first arm of the pendulum is substantially longer and heavier than the opposing arm of the pendulum.

48. The printer of claim 44, wherein the mechanical advantage linkage includes a piston pivotally coupled to the first arm of the pendulum, the piston is mounted for reciprocation along a piston path on the print carriage, and the piston path includes the pump actuator.

49. The printer of claim 43, wherein the inertial mass extends outwardly with respect to the print carriage and reciprocates a swinging motion.

50. The printer of claim 49, wherein the inertial mass extends below the print carriage.

51. The printer of claim 43, further comprising a plurality of the ink pumps for a corresponding plurality of printer inks.

52. The printer of claim 51, further comprising a corresponding plurality of the inertial mass and mechanical advantage linkage combinations for the respective plurality of the ink pumps.

53. The printer of claim 51, wherein:
the plurality of ink pumps each respectively include a pump actuator; and
the inertial mass is indirectly linked to each of the pump actuators by the mechanical advantage linkage.

54. The printer of claim 43, wherein the mechanical advantage linkage includes a lever mechanism.